



# Ground Truth Observations & Importance of Data Quality

January 27, 2020

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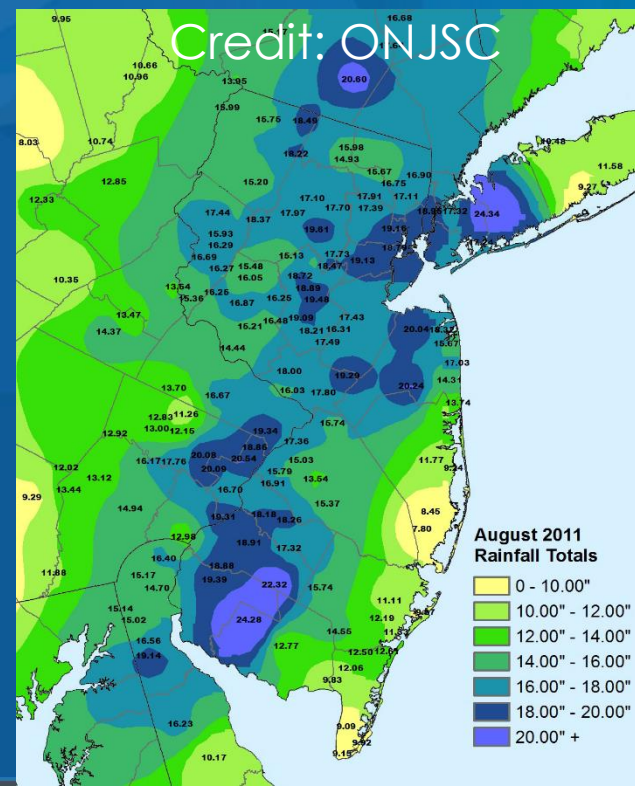
# Outline

- My Background
- Define “Ground Truth Observations”
- Weather Instruments & Data Networks
- Why Should We Care?
- Conclusion



# My Background

- Bachelor's Degree in Meteorology Rutgers University 2007-2011
- Weather Observer for New Brunswick Cooperative Weather Station
- Research Assistant for NJ State Climatologist
- Operational Meteorologist Private Sector 2011-2016
- Joined NWS Albany Staff Jan 2017



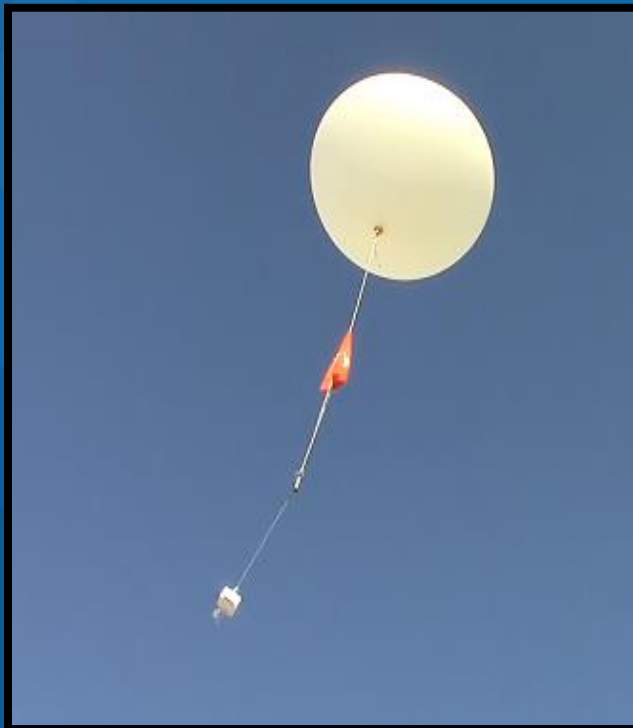


# Define" Ground Truth Observations"

**Snow, rain, wind or temperatures measured with weather instruments at the ground. Models give us a prediction but we need to verify our forecasts using real weather instruments.**



28 inches of snow!  
January 2016



Weather Balloons  
NWS Albany



7.40 inches of rain!  
Jul 30 – Aug 14, 2018

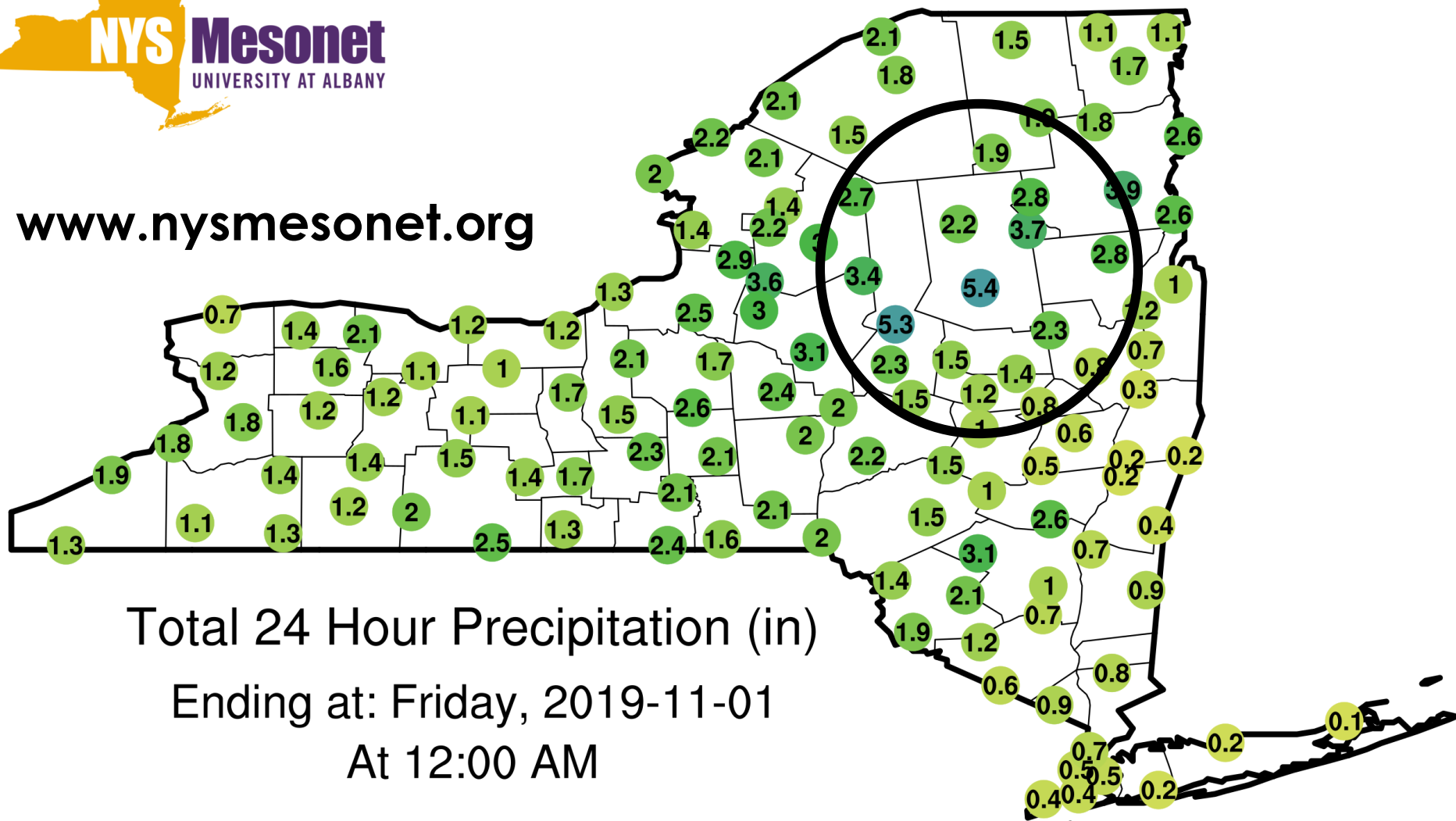




# Halloween 2019 Flooding Event



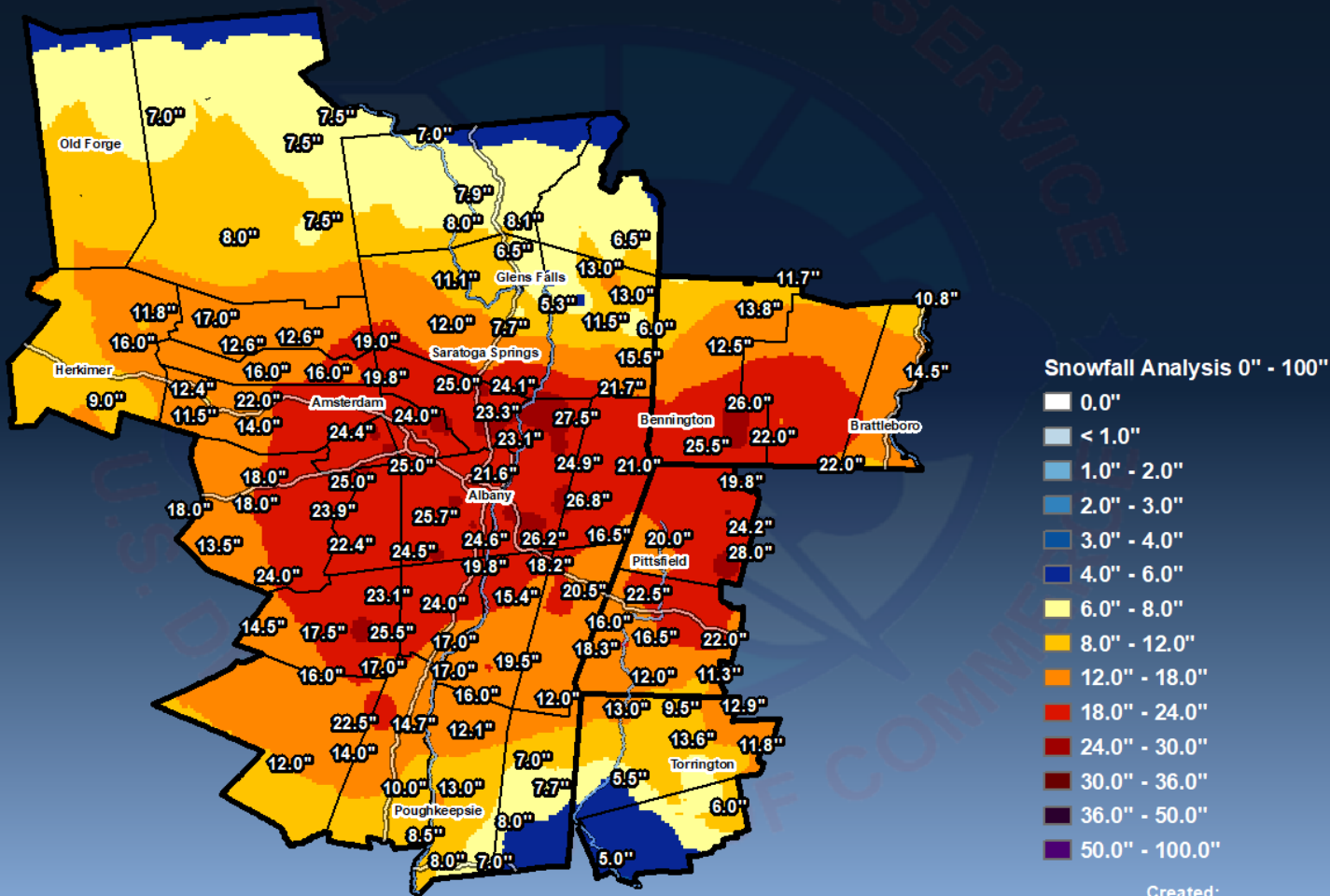
[www.nysmesonet.org](http://www.nysmesonet.org)





# December 1 – 3, 2019 Snow Storm

## National Weather Service Albany New York Snowfall Analysis 12/01/2019 07:00AM to 12/03/2019 07:00AM Analysis Data Source: Regional Observations



Created:  
12/05/2019 02:01PM



# Weather Instruments & Data Networks

**Let's Discuss!** What are examples of climate data networks?

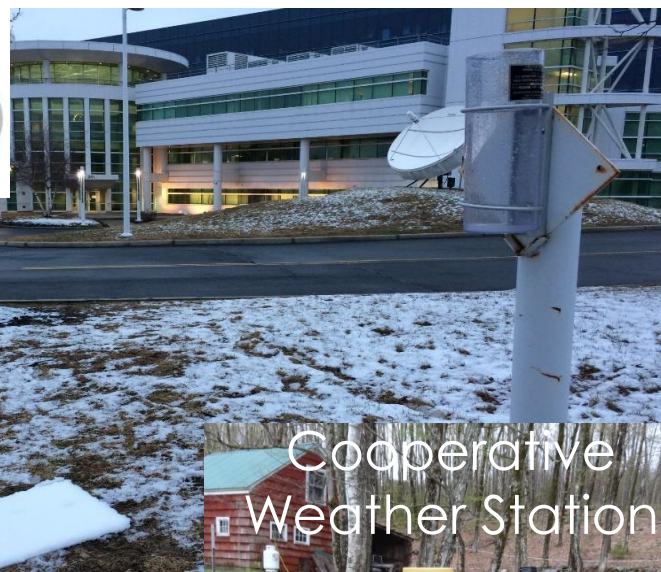




# Weather Instruments & Data Networks



ASOS



Cooperative Weather Station



ASOS



Cooperative Weather Station



Cooperative Weather Station





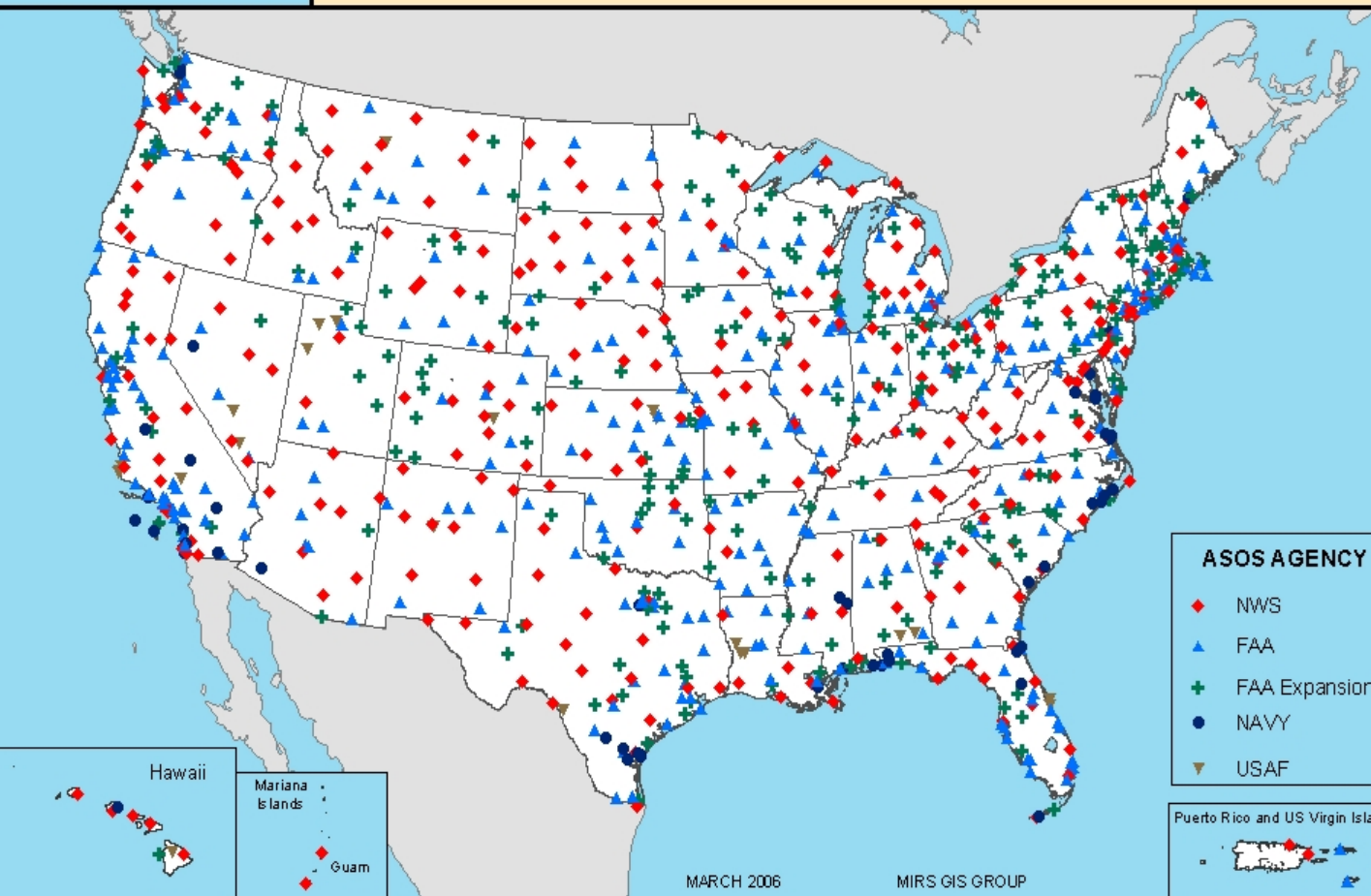
# Weather Instruments & Data Networks



Alaska

## NATIONAL WEATHER SERVICE ASOS SITES

### Automated Surface Observing System (ASOS)



#### ASOS AGENCY

- ◆ NWS
- ▲ FAA
- + FAA Expansion
- NAVY
- ▼ USAF

Puerto Rico and US Virgin Islands

#### ASOS Measure Calendar Day....

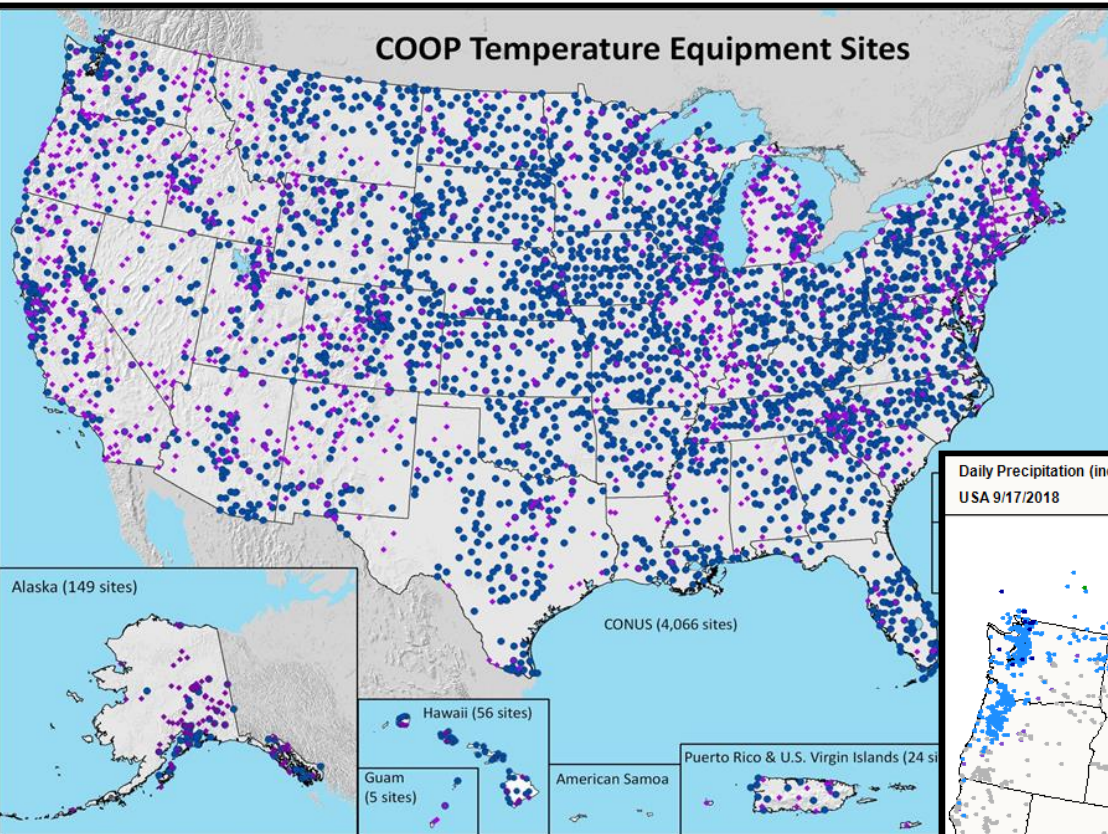
- Temperature
- Precipitation Amount & Type
- Wind speed & direction
- Pressure
- Cloud Coverage & Ceilings
- Ice Accretion
- Lightning
- Visibility

Major Airports have Contract Weather Observers (CWO)- Measure snowfall!



# Weather Instruments & Data Networks

COOP Temperature Equipment Sites



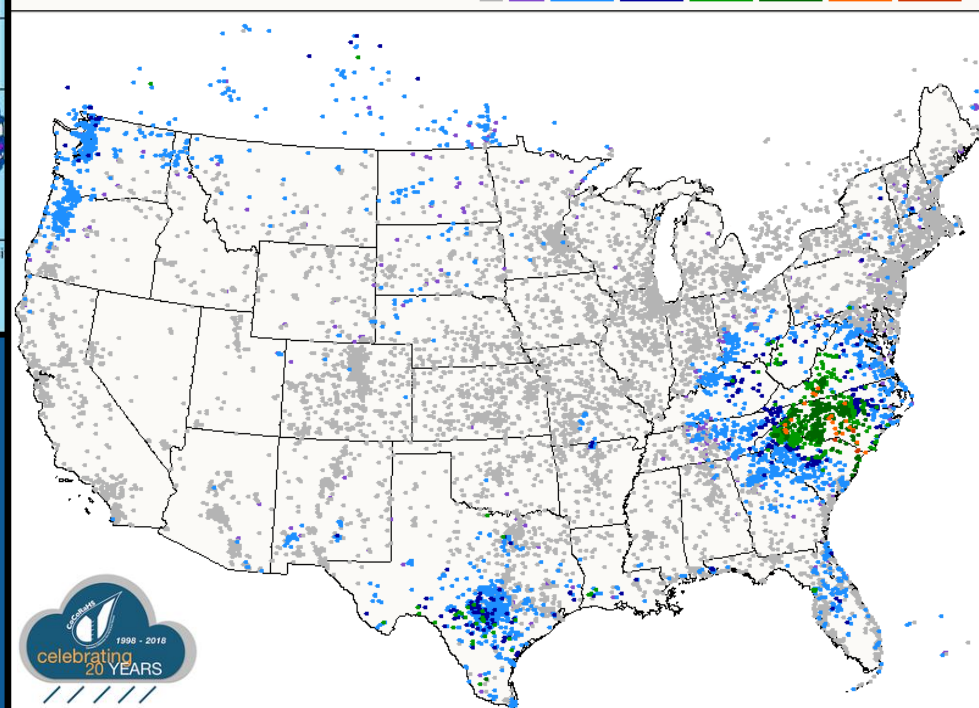
CoCoRaHs Stations **Measure**  
**7/8am-7/8am** ....

- Snowfall and Precipitation

Daily Precipitation (inches x.xx), for the 24 hour period ending ~7:00 am

USA 9/17/2018

0.0 Trace 0.01-0.58 0.59-1.16 1.17-2.91 2.92-7.00 7.01-10.50 10.51-11.68



Cooperative Weather Stations  
(Coop) **Measure 7/8am-7/8am**....

- Temperature (Max/Min/Obs)
- Snowfall and Precipitation







# NYS Mesonet

Courtesy of Daily Gazette

*Anemometer*

*Temperature/Dew Point  
Sensors*

*Rain Gauge*

on (ft)  
4200  
3600  
3000  
2400  
1800  
1200  
600  
0

Ele





# Why Should We Care?

- Learn current conditions, verify forecasts & learn about model biases
- Maintain the integrity of climate database (need to quality control data!)
- Create 30 year climate normals (NCEI)
- Disaster Declarations from FEMA



# Fast Climate Facts

	Albany, NY
Normal Seasonal (Oct – Apr) Snowfall	60.3"
Normal Annual Precipitation	39.35"
Normal Monthly Temperature for January	22.6°F (Jan 2020 +9.9°F above normal as of 1/26/20)



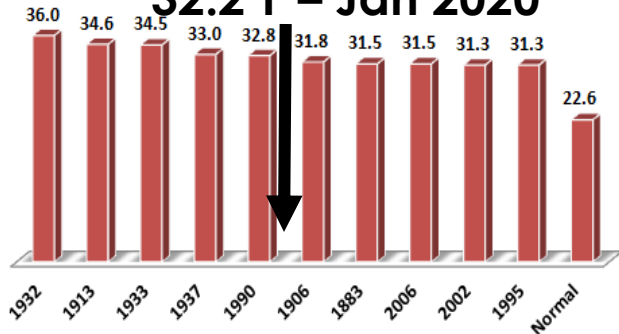
## January - Top 10 Warmest Albany, NY (1820-present)

Updated: February 2019



■ Temperature = Degrees Fahrenheit    Normal = 1981-2010

**32.2°F – Jan 2020**



## Top 20 Greatest Snowstorms

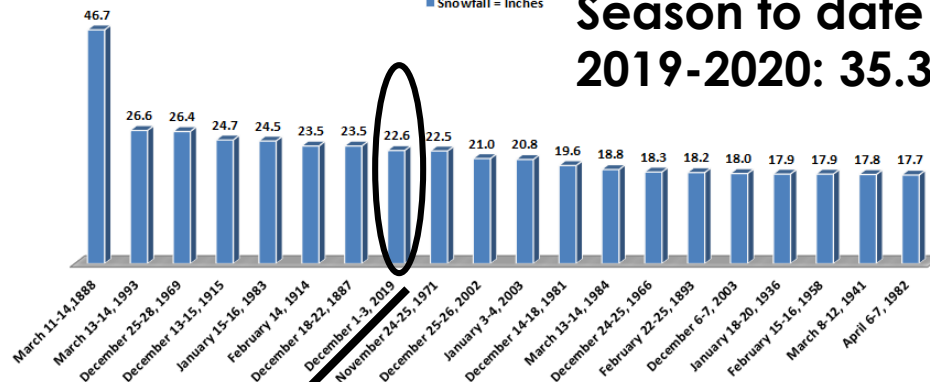
Albany, NY (1884-85 to present)

Updated: December 2019



■ Snowfall = Inches

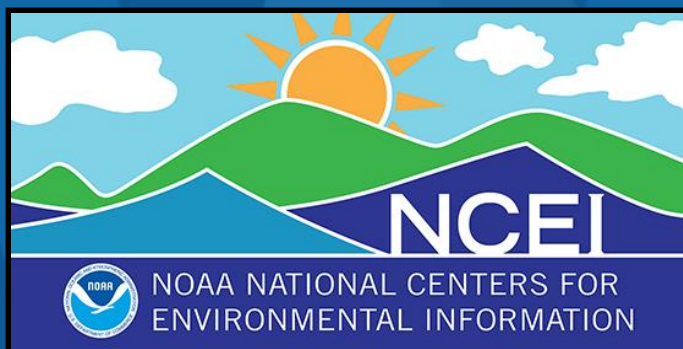
**Season to date  
2019-2020: 35.3"**





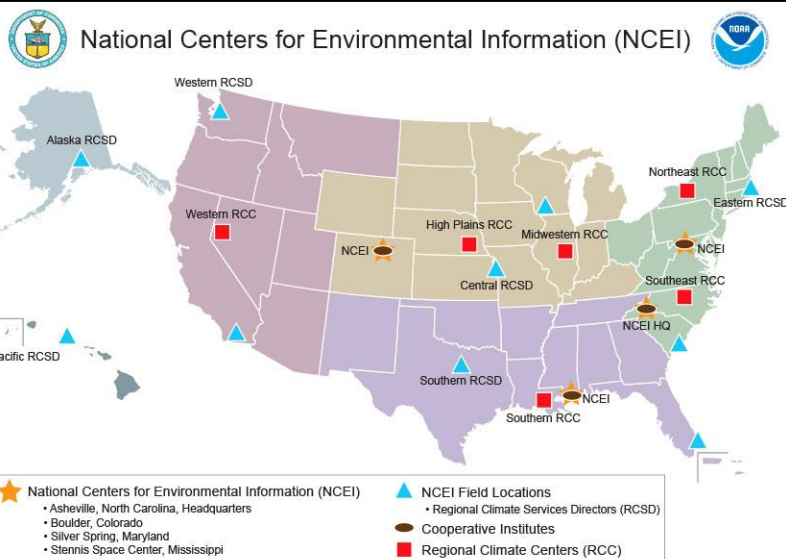
# Why Should We Care?

## Where Can We Access Past Weather Data?



## Who Uses Past Weather Data?

- Meteorologists and Climatologists
- Forensic Meteorologists
- Insurance and Law Firms
- FEMA and State Agencies
- Universities
- Engineers
- Many More!







# References

- NWS Albany Climate Page  
([www.weather.gov/aly/climate](http://www.weather.gov/aly/climate))
- Northeast Regional Climate Center  
(<http://www.nrcc.cornell.edu/>)
- National Center for Environmental Information  
([www.ncei.noaa.gov](http://www.ncei.noaa.gov))
- CoCoRaHs  
([www.cocorahs.org](http://www.cocorahs.org))